

Application No. 10/502,052
Response to Office Action dated January 10, 2012

REMARKS/ARGUMENT

Initially, Applicants would like to thank Examiner Brayton for the courteous telephonic Interview conducted January 17, 2012, during which possible claim amendments were discussed.

Claim 15 has been amended by incorporating claim 1 into it.

Claims 1 and 16 have been canceled.

The remaining claims have been amended as appropriate to conform to claim 15 as amended.

New claim 29 has been added, and claim 21 has been amended to depend from it.

Claims 2, 5-15, 17, 18, 20, 21 and 23-29 are currently pending.

The Office Action maintained the following rejections: (1) claims 1, 2, 15, 23 and 24 under 35 U.S.C. § 103 as obvious over JP 62-297451 (“Narita”) in view of U.S. patent 6,521,098 (“Lin”); (2) claims 27 and 28 under 35 U.S.C. § 103 as obvious over JP 62-297451 (“Narita”) in view of U.S. patent 6,521,098 (“Lin”) and U.S. patent 6,193,856 (“Kida”); (3) claims 1, 2, 15, 23, 24, 27 and 28 under 35 U.S.C. § 103 as obvious over U.S. patent 4,107,019 (“Takao”) in view of U.S. patent 6,521,098 (“Lin”) and U.S. patent 6,193,856 (“Kida”); (4) claims 1, 2, 15, 23 and 24 under 35 U.S.C. § 103 as obvious over U.S. patent 4,107,019 (“Takao”) in view of U.S. patent 6,521,098 (“Lin”); (5) claims 5, 6, 25 and 26 under 35 U.S.C. § 103 as obvious over Takao, Lin, and U.S. patent 5,981,092 (“Arai”); (6) claims 7-14 under 35 U.S.C. § 103 as obvious over Takao, Lin, Arai, and U.S. patent

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5,522,976 (“Campet”); (7) claims 16-18 under 35 U.S.C. § 103 as obvious over Takao, Lin, and U.S. patent 5,831,760 (“Hashimoto”); (8) claim 20 under 35 U.S.C. § 103 as obvious over Takao, Lin, and IBM technical disclosure; and (9) claim 21 under 35 U.S.C. § 103 as obvious over Takao, Lin, and U.S. patent 5,905,590 (“Van Der Sluis”). In view of the following comments, Applicants respectfully request reconsideration and withdrawal of these rejections.

The present invention relates to processes for manufacturing an electrochemical device, comprising producing an electrochemically active layer by magnetically enhanced sputtering using an essentially ceramic, spray-coated target comprising predominantly nickel oxide NiO_x , wherein the nickel oxide is oxygen-deficient with respect to the stoichiometric composition NiO , wherein x is less than 1 and wherein the target has an electrical resistivity of less than 10 ohm.cm. These physical characteristics associated with the target provide the target and associated sputtering using the target with improved properties which, prior to the present invention, were not available to the public.

More specifically, the undisputed evidence of record (Rule 132 declaration) demonstrates spray coating allows formation of targets having much higher densities (lower porosity) than pressing and sintering, resulting in improved targets. (Rule 132 dec, par. 2). For example, pressing and sintering a target contains predominantly nickel oxide results in a target having a density of 75%-85%. (Rule 132 dec, par. 3). In contrast, spray coated targets containing predominantly nickel oxide generally have much higher density, for example 95%-97% density. (Rule 132 dec, par. 4).

Further, the evidence of record demonstrates that targets having higher density have improved properties as compared to targets having lower density, including but not limited to improved stability during processing. Before sputtering/during vacuuming, a smaller porosity implies that fewer impurities have been adsorbed from air and, thus, a quicker degassing of the vacuum chamber; and during sputtering, a smaller porosity decreases the apparition of micro arcs at the surface of the target and, thus, there is a higher stability of the process as well as decreased aging of the target. (Rule 132 dec, par. 5).

Still further, the examples and figures in the present application demonstrate that the voltage on the spray-coated, oxygen-deficient targets of the present invention (figure 2) shows appreciable transition among varying oxygen concentrations, whereas the Ni target of the comparative example (figure 1) does not. As explained on page 10 of the present application, this difference means that the invention targets make “it possible to run the process with greater stability, while still guaranteeing optimum control of the properties of the films.”

Accordingly, the undisputed evidence of record demonstrates that (1) spray-coated, oxygen-deficient targets are different from other targets for a magnetically enhanced sputtering device; and (2) spray-coated, oxygen-deficient targets have different, improved properties from other targets for a magnetically enhanced sputtering device, particularly when used during the manufacture of electrochemical devices.

The primary references, Takao and Narita, are deficient because (1) they do not teach or suggest a target that is spray-coated; (2) they do not relate to magnetically enhanced

sputtering device; and/or (3) they relate to blending of Ni/NiO. Thus, these references clearly do not relate to claimed methods requiring magnetically enhanced sputtering using the required target.

Lin cannot compensate for these fatal deficiencies. Lin does not disclose a target which has been spray coated and which has the required oxygen deficient NiOx of the present invention.

The remaining applied references do not compensate for these fatal deficiencies as well. Nothing in any of the references would have motivated one of ordinary skill in the art to modify the disclosures in the primary references to spray coat an acceptable target in a magnetically enhanced sputtering device as required by the pending claims, and/or to modify them in such a way as to spray coat a target having oxygen deficiency and/or the electrical resistivity set forth in the claims. With particular reference to Kida, Kida's col. 3 does not teach or suggest a ceramic layer containing Ni. Further, Kida's col. 5 relates to an underlayer, not Kida's "ceramic layer." Thus, Kida's col. 5 does not disclose a NiO "ceramic layer," let alone the presently claimed ceramic target having the required NiO.

In view of the above, Applicants respectfully request reconsideration and withdrawal of the pending rejections under 35 U.S.C. §103.

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Applicants believe that the present application is in condition for allowance. Prompt and favorable consideration is earnestly solicited.

Respectfully submitted,

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